11/18/13 Agenda

- Warm Up

- Review Homework - Worksheet 1

- Section 5.2 - Perpendicular Bisectors

- ~~Review Test~~

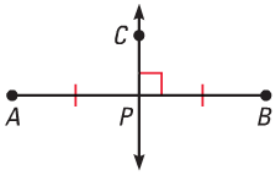
- Start Homework
    - Worksheet 2 - Perpendicular Bisectors

Section 5.2 - Perpendicular Bisectors Target 5B

Goal: Solve problmes involving the perpendicular bisector of a triangle.

In Lesson 1.3, you learned that a segment bisector intersects a segment at its midpoint. A segment, ray, line, or plane that is perpendicular to a segment at its midpoint is called a **perpendicular bisector**.

A point is **equidistant** from two figures if the point is the *same distance* from each figure. Points on the perpendicular bisector of a segment are equidistant from the segment's endpoints.



$\overleftrightarrow{CP}$ is a ⊥ bisector of $\overline{AB}$.

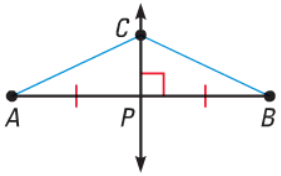
THEOREMS *For Your Notebook*

THEOREM 5.2 Perpendicular Bisector Theorem

In a plane, if a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

If $\overleftrightarrow{CP}$ is the ⊥ bisector of $\overline{AB}$, then $CA = CB$.

Proof: Ex. 26, p. 308

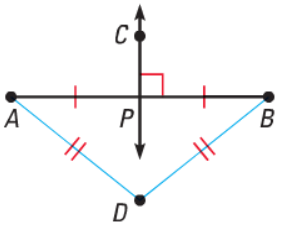


THEOREM 5.3 Converse of the Perpendicular Bisector Theorem

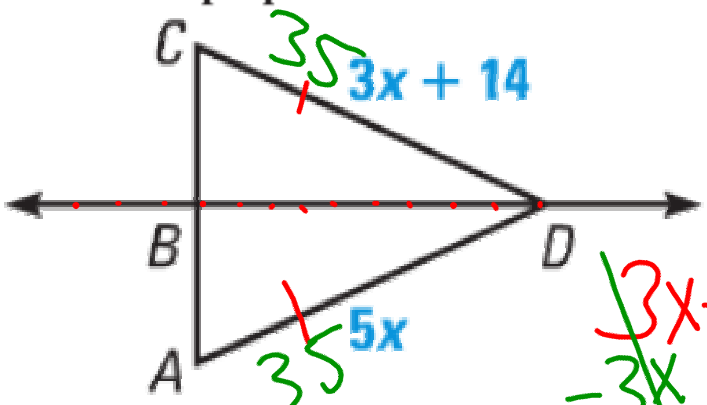
In a plane, if a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.

If $DA = DB$, then D lies on the ⊥ bisector of $\overline{AB}$.

Proof: Ex. 27, p. 308



$\overleftrightarrow{BD}$ is the perpendicular bisector of $\overline{AC}$. Find AD.



$CD = AD$

$3x + 14 = 5x$

$-3x \quad -3x$

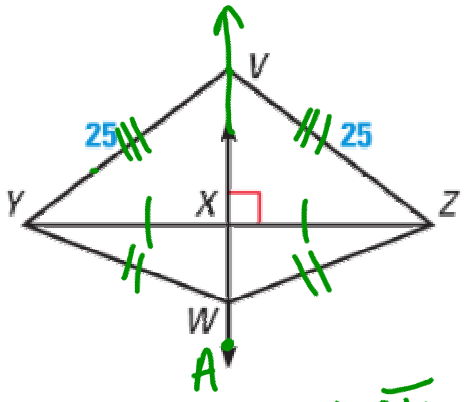
$14 = 2x$

$7 = x$

In the diagram, $\overleftrightarrow{WX}$ is the perpendicular bisector of $\overline{YZ}$.

a. What segment lengths in the diagram are equal?

b. Is V on $\overleftrightarrow{WX}$? YES



$\overline{AZ} \cong \overline{AY}$

Section 5.2 - Perpendicular Bisectors Target 5B

CONCURRENCY When three or more lines, rays, or segments intersect in the same point, they are called **concurrent** lines, rays, or segments. The point of intersection of the lines, rays, or segments is called the **point of concurrency**.

As you saw in the Activity on page 304, the three perpendicular bisectors of a triangle are concurrent and the point of concurrency has a special property.

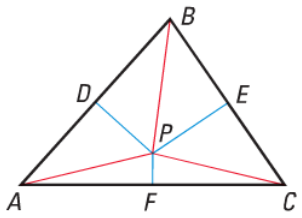
THEOREM *For Your Notebook*

THEOREM 5.4 Concurrency of Perpendicular Bisectors of a Triangle

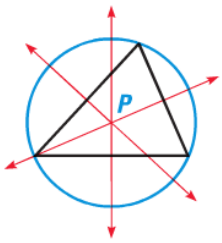
The perpendicular bisectors of a triangle intersect at a point that is equidistant from the vertices of the triangle.

If $\overline{PD}$, $\overline{PE}$, and $\overline{PF}$ are perpendicular bisectors, then $PA = PB = PC$.

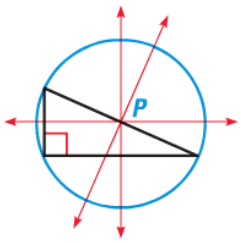
Proof: p. 933



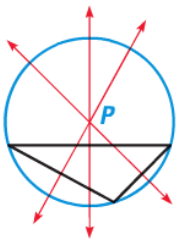
CIRCUMCENTER The point of concurrency of the three perpendicular bisectors of a triangle is called the **circumcenter** of the triangle. The circumcenter P is equidistant from the three vertices, so P is the center of a circle that passes through all three vertices.



Acute triangle
***P* is inside triangle.**



Right triangle
***P* is on triangle.**

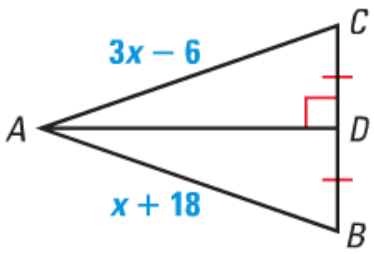


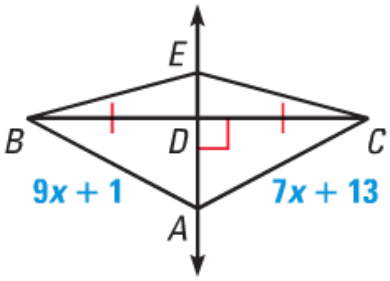
Obtuse triangle
***P* is outside triangle.**

As shown above, the location of P depends on the type of triangle. The circle with the center P is said to be *circumscribed* about the triangle.

Section 5.2 - Perpendicular Bisectors Target 5B

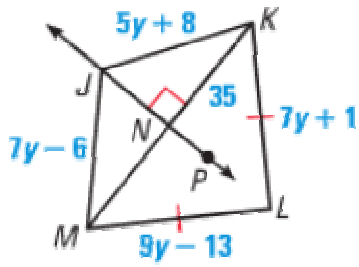
Find the length of $\overline{AB}$.





Section 5.2 - Perpendicular Bisectors Target 5B

PERPENDICULAR BISECTORS In Exercises 11–15, use the diagram. $\overleftrightarrow{JN}$ is the perpendicular bisector of $\overline{MK}$.



11. Find NM. 35

12. Find JK. 43

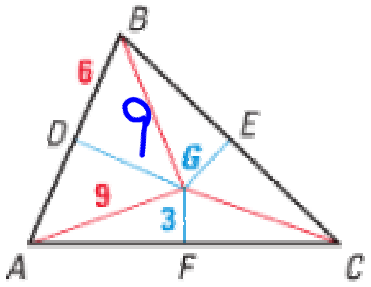
13. Find KL. 50

14. Find ML. 50

15. Is L on $\overleftrightarrow{JP}$? *Explain* your reasoning.

YES, $\overline{ML} \cong \overline{KL}$

Find BG.



17. Find GA.